NetShelter® Premium Enclosure

AR1000A
AR1001A
AR1100A

User's Manual

APC®

This manual is available in English on the enclosed NetShelter CD.

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Dieses Handbuch ist in Deutsch auf der beiliegenden NetShelter CD-ROM verfügbar.

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Este manual está disponible en español en el CD-ROM de NetShelter adjunto.

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Ce manuel est disponible en français sur le CD-ROM NetShelter ci-inclus.

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Questo manuale è disponibile in italiano nel CD-ROM NetShelter allegato.

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O manual em Português está disponível no CD-ROM NetShelter em anexo.

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本マニュアルの日本語版は同梱の NetShelter CD-ROM からご覧になれます。

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Preliminary Information

Product Overview

This American Power Conversion (APC) NetShelter® Premium Enclosure is a high-quality enclosure designed for storage of industry-standard (EIA-310-D) 19-inch rack-mount hardware, including servers, voice, data, networking, internetworking, and APC power protection equipment.

Three NetShelter Premium Enclosures

APC offers three NetShelter Premium Enclosures:

Model	Description
AR1000A	Complete 42-U† stand-alone enclosure
AR1001A	42-U expansion enclosure that connects to a single AR1000A enclosure to create a set of enclosure bays
AR1100A	Complete 22-U stand-alone enclosure

† One U = 1.75 in. (4.44 cm). On a NetShelter enclosure, a U is represented as a notched mounting hole and one mounting hole immediately above and below it. See page 14.

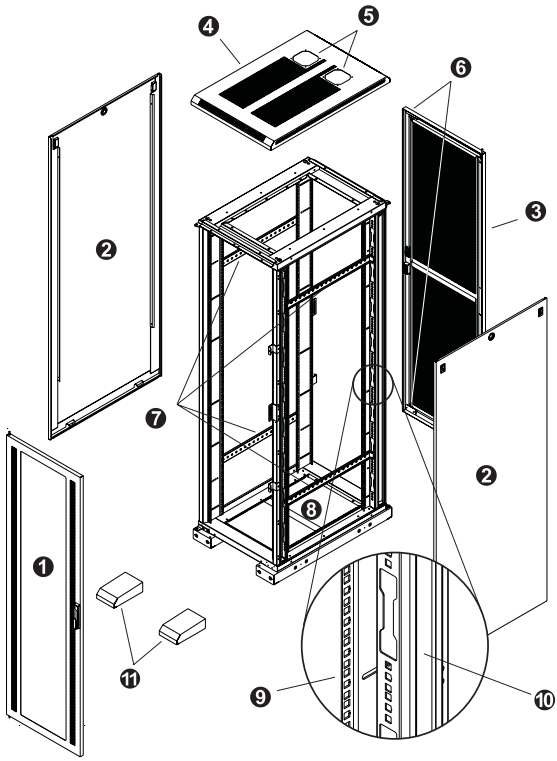
Continued on next page

Features of the enclosure

- 42 U (73.5 in.) or 22 U (38.5 in.) of storage height for 19-inch rack-mount equipment
- Ventilated doors and roof
- Smoked, tempered-glass front door
- Front and rear door locks
- Quick-release side panels with locks (AR1000A and AR1100A)
- Adjustable leveling feet
- Heavy-duty casters
- Configurable horizontal braces and vertical mounting rails
- Cable management hoops
- Ample clearance between the front door and the mounting rails for wiring
- Adjustable-depth frame
- Reversible front and rear doors with quick release
- Large holes in the frame posts for routing cable

Product Inventory

Components of models AR1000A and AR1001A



❶ Front door

❷ Side panels (AR1000A)

❸ Rear door

❹ Roof

❺ Cable access holes

❻ Mounting posts for door switch sensors for environmental monitoring (front and rear doors)

Braces

❽ Cable entry panels

Mounting rails

Frame posts

❿ Detachable feet

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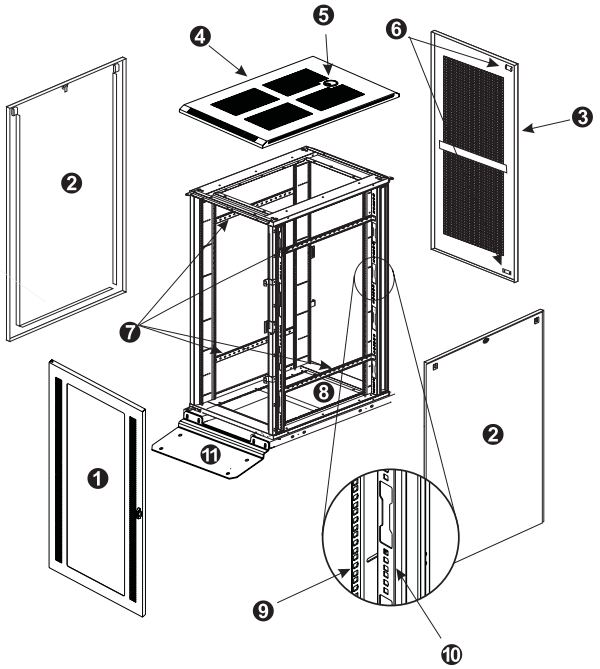
Product Inventory *continued*

Components of model AR1100A



❶ Front door
❷ Side panels
❸ Rear door
❹ Roof
❺ Cable access hole
❻ Mounting posts for door switch sensors for environmental monitoring (front and rear doors)
❼ Braces
❽ Cable entry panels
Mounting rails
Frame posts
⓫ Stabilizer plate

Continued on next page

Product Inventory *continued*

Inventory of expansion and mounting hardware

Item	AR1000A	AR1001A	AR1100A
Expansion hardware			
Expansion rackets	–	4	–
Vertical finishing trim	–	2	–
Horizontal finishing trim	–	1	–
M6 hex nuts	–	4	–
M6 x 12 socket-head screws	–	8	–
M6 caged nuts	–	8	–
Mounting hardware			
M6 × 16 mm Phillips/slotted screws	60	60	60
Caged nut installation tool	1	1	1
M6 caged nuts	60	60	60
Plastic cup washers	60	60	60
13 mm/14 mm open-end wrench	1	1	1
M5 Allen wrench	1	1	1
Cable management hoops	3	3	3
Door/side panel keys	2	2	2

How to Install the Enclosure

Before You Install the Enclosure

Warnings and cautions

Before you begin to unpack the enclosure, read and follow these warnings to prevent injury and damage:

- Use at least two persons to unpack the enclosure.
- Stabilize the enclosure before installing the components—failure to do so could allow the enclosure to tip over.
- Do not extend more than one component from the enclosure at one time to prevent the enclosure from becoming dangerously unstable.
- Load the heaviest components first and place them toward the bottom of the enclosure to prevent the enclosure from becoming top-heavy.

Location of keys and mounting hardware

The keys are packed inside the enclosure, fastened at the top of one of the mounting rails. The bag containing the mounting hardware is fastened to the floor of the enclosure. To gain access to the inside of the enclosure, remove the side panel. (See page 13.) The 13/14 mm wrench is attached to the front of the shipping pallet, just under the packaging.

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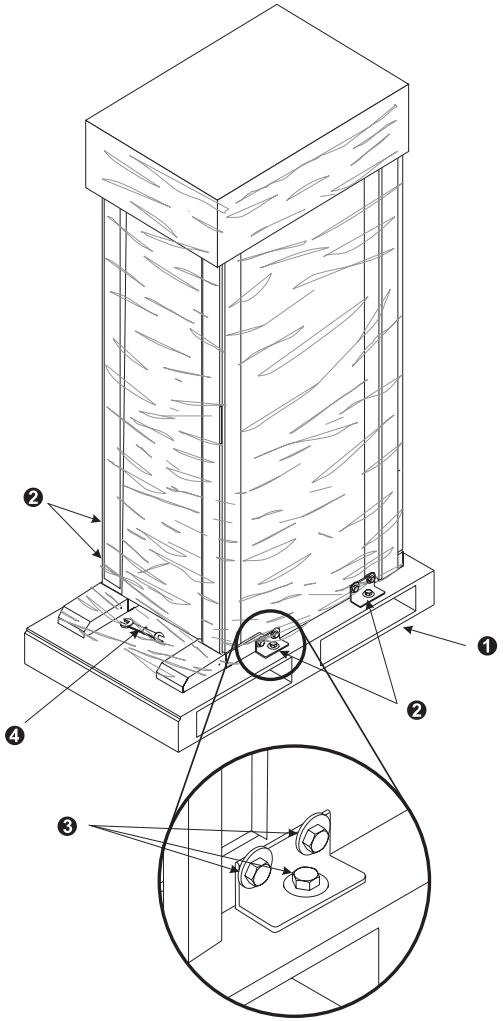
Enclosure packaging



❶ Shipping pallet
❷ Brackets
❸ Bolts
❹ 13/14 mm wrench

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How to unpack the enclosure

1. Move the shipping pallet to a firm, level surface in an open area. Inspect the enclosure for visible signs of shipping damage.
2. Refer to the label on the packaging to determine where to cut the wrapping. Using heavy-duty shears or a utility knife, carefully remove the plastic stretch-wrap surrounding the enclosure.
3. Remove the cardboard cover and the four, tall, cardboard corner protectors.
4. Remove the four brackets that are anchoring the enclosure to the shipping pallet. Use the 13/14 mm wrench (provided) to remove the hex-head screws that secure the brackets to the pallet.
5. With one person on each side of the enclosure, carefully roll the it toward the rear of the pallet until the rear casters clear the back edge of the pallet. Continue to slide the enclosure rearward until the rear casters make contact with the floor.
6. While one person carefully tips the enclosure slightly away from the pallet, have the other person pull the pallet away from the enclosure.

   Note: Save the pallet if you intend to reship the enclosure in the future.
7. Inspect the enclosure for shipping damage. If you detect shipping damage, contact APC Customer Support at the number listed on the yellow sticker on the front of the enclosure.

Disclaimer

APC is not responsible for damage sustained during reshipment of this enclosure.

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Take inventory

After unpacking the enclosure, verify that all required components and hardware have been shipped with the enclosure. See “Product Inventory” beginning on page 3.

Note: If any items are missing, contact APC Customer Support using a number or Web address listed on the back cover of this manual.

Configuration

Before installing your enclosure, plan the location of the equipment to be installed. Consider the proximity needed by some equipment, ergonmics of keyboards and video monitors, and the maximizing of U-space.

The NetShelter Configurator, available on the APC Web site, helps you plan your configuration to maximize the available U-space of your enclosure(s).

Warning

To maintain proper air flow, cover any empty vertical enclosure space with blanking panels (AR8101, not included). Improper air flow could damage installed components.

To avoid damage or injury, level and stabilize the enclosure in its permanent location before loading equipment.

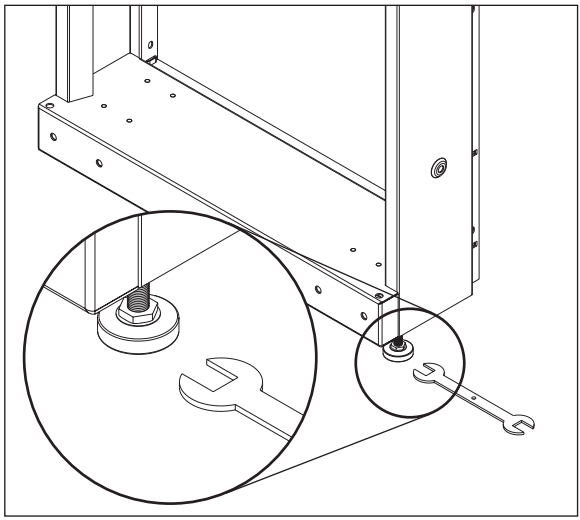
How to Level the Enclosure

Leveling feet

Leveling feet are attached under the enclosure at each corner. Two leveling feet are also attached to the underside of the detachable feet (included on the AR1000A and AR1001A). The leveling feet can help provide a stable base if the selected floor space is uneven but are not intended to compensate for a badly sloped surface.

Leveling procedure

1. Move the enclosure to a relatively level location.
2. Fit the 14 mm open-end wrench (included) to the hex nut just above the round pad on the bottom of the leveling foot. Turn the wrench clockwise to extend the leveling foot until it makes firm contact with the floor.



3. Repeat step 2 for each of the remaining leveling feet.
4. Use a spirit level to determine which feet need further adjustment to level the enclosure. Adjust as necessary.

How to Stabilize the Enclosure

Stabilizing kits

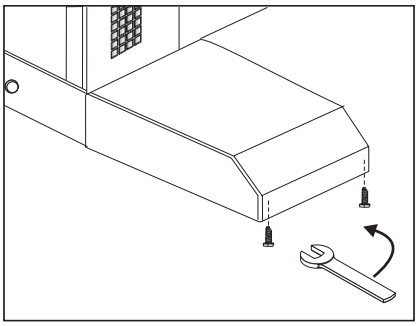
The AR1000A and AR1001A enclosures are shipped with the detachable feet installed. American Power Conversion offers two additional products for stabilizing enclosures:

- Stabilizer Plate Kit (AR8111)—one front plate, two side plates, and mounting hardware for attaching to the enclosure frame. Stabilizer plates may also be bolted to the floor to add stability.
- Bolt Down Bracket Kit (AR8112)—four brackets and mounting hardware for attaching to the enclosure frame on the sides (exterior or interior). These brackets must be bolted to the floor.

If you use one of these kits, you will first need to remove the detachable feet.

How to remove the feet

1. Loosen the screws located just under the cover on each side of the foot. To loosen, use a 10mm open-end wrench and turn the wrench clockwise. Do not remove the hex screws.



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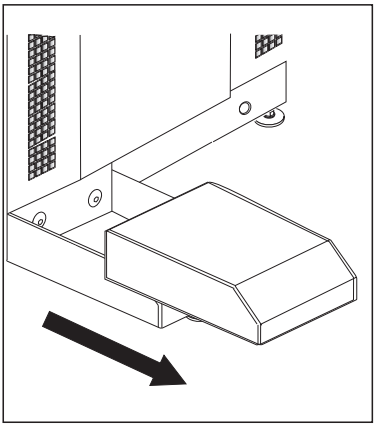
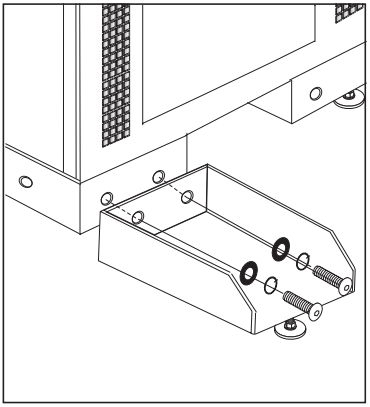
How to remove the feet, continued

2. Slide the cover off the base in a horizontal motion.



3. Remove the two 8 mm socket-head screws using the 5mm Allen wrench (included) to remove the foot.



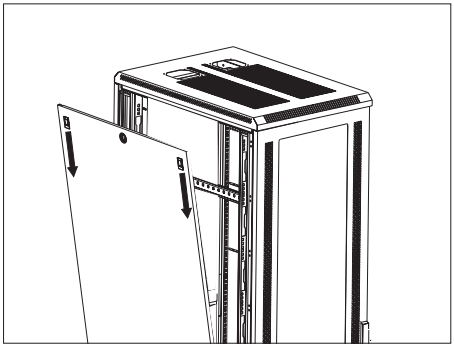
4. Repeat steps 1–3 for the other foot.

Side Panels

How to remove and install the side panels

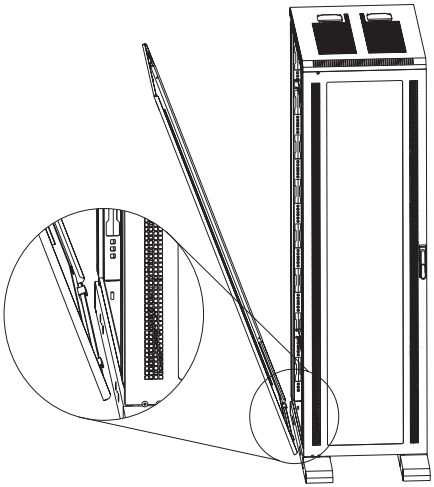
You can remove the side panels for access to the interior. To remove the side panels:

1. Use the key to unlock the panel, if necessary.
2. Slide both panel latches down at the same time and tip the top of the panel toward you.



3. Release the latches and lift the panel up and off the narrow horizontal lip at the bottom of the enclosure frame.

To reinstall: Engage the bottom of the panel securely with the rail before pushing the top of the panel forward into place.

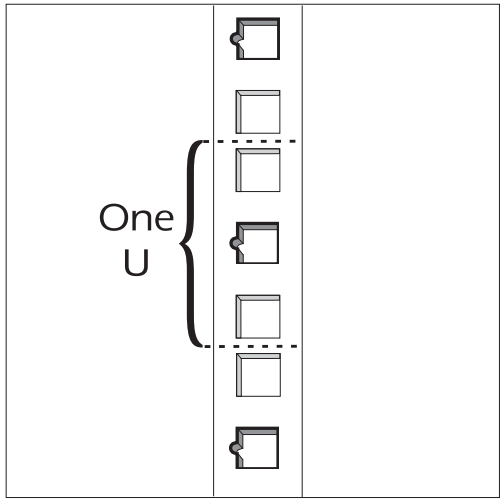


How to Install Equipment

This section gives general information on mounting rack equipment in the enclosure. See also the instructions provided with the equipment to be installed.

How to identify one U-space on the mounting rail

When installing equipment, you will need to locate the beginning and end of a U-space on the mounting rails. Every third mounting hole on the mounting rails of a NetShelter enclosure is notched to indicate the middle of a U-space. A U-space takes up one of these notched holes and one hole immediately above and below it, as shown.



Caged nuts

During installation of equipment in your enclosure, you may need to install or remove caged nuts. Follow the procedures in this section when installing or removing caged nuts from the enclosure.

Continued on next page

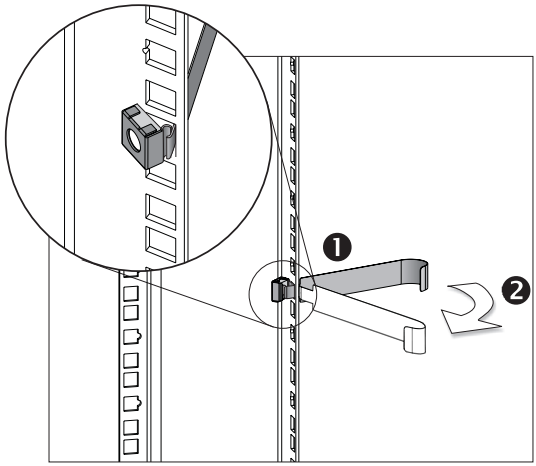
Warning

Install caged nuts with the ears engaging the sides of the mounting hole. Do NOT install caged nuts with the ears engaging the top and bottom of the mounting hole.

How to install and remove caged nuts

Note: Install the caged nuts on the side of the mounting rails that is opposite the equipment to be mounted.

1. Insert the caged nut into the mounting hole by hooking one ear of the caged nut assembly through the far side of the hole.
2. Place the caged nut tool (included) on the other ear of the caged nut and pull to snap it into position.



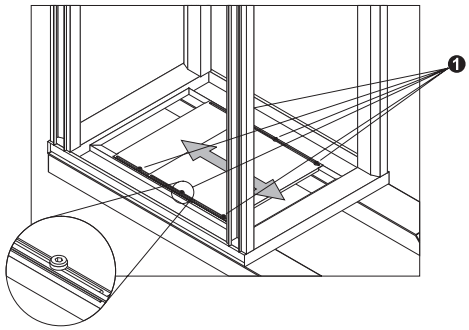
3. Detach the tool from the caged nut.

To remove: Remove any attached screw and reverse the action in step 2. Grasp the caged nut before releasing the tool.

Cable Management

Location of bottom cable entry panels

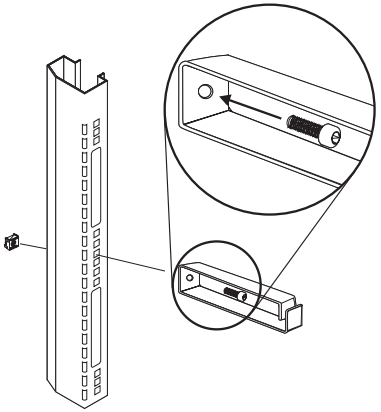
You can adjust or remove the two bottom cable entry panels to vary the size of the opening(s) in the bottom of the enclosure. Use a 5 mm Allen wrench (included) to loosen or remove the six socket-head screws ❶ that secure the two cable entry panels to the base of the enclosure.



Cable management hoops

Cable management hoops (provided) may be fastened on any of the four mounting rails. Secure the hoop to a hole on the rail using a caged nut and socket-head screw.

Note: For clarity, the cable management hoops below appear opening to the side. The hoops should open upward.



How to Reverse the Door

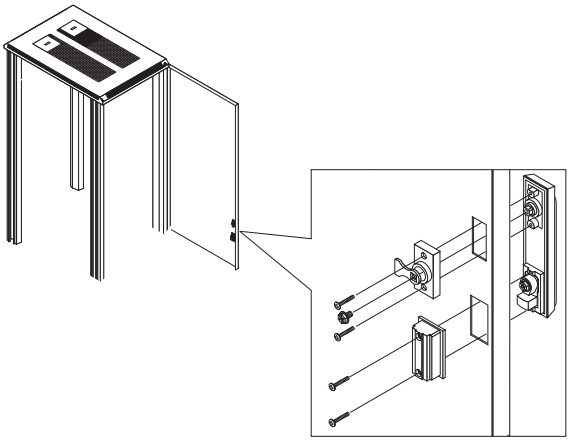
You can reverse or remove the front and rear doors to accommodate your site configuration. This section shows how to remove and reverse the doors on your enclosure.

Procedure

1. *AR1000A and AR1100A:* Remove both side panels. (See page 13.)

Reverse the door handle (42U)

2. *AR1000A and AR1001A:*
   a. Use a slotted or Phillips screwdriver to remove the screw holding the door latch to the door handle assembly.
   b. Remove the four Phillips screws from the rear of the door handle assembly and remove the handle assembly from the door.



   c. Rotate the door handle assembly 180° and reinstall it using the hardware removed in step b.
   d. Continue with “Remove the door” on page 18.

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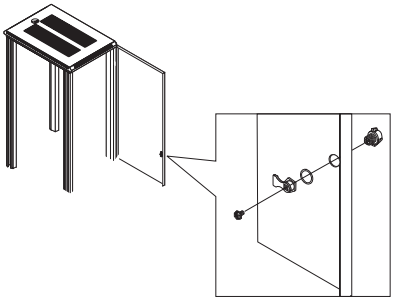
How to Reverse the Door *continued*

Reverse the door handle (22U)

AR1100A:

a. Use a 19 mm wrench to loosen the nut securing the lock to the door.

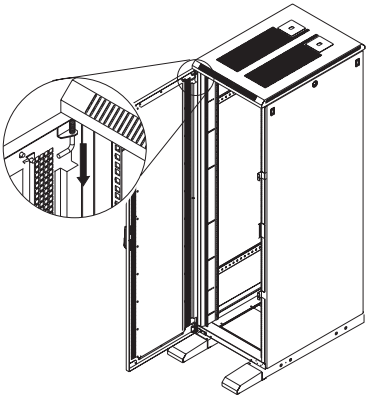


b. Rotate the door handle assembly 180° and then secure by tightening the screw.

Remove the door

To avoid personal injury or damage to the enclosure, one person should support the door while another releases the door from its frame.

3. Open the door and pull down on the spring-loaded hinge pin attached to the top of the door. Lift the door from its frame and set safely aside.



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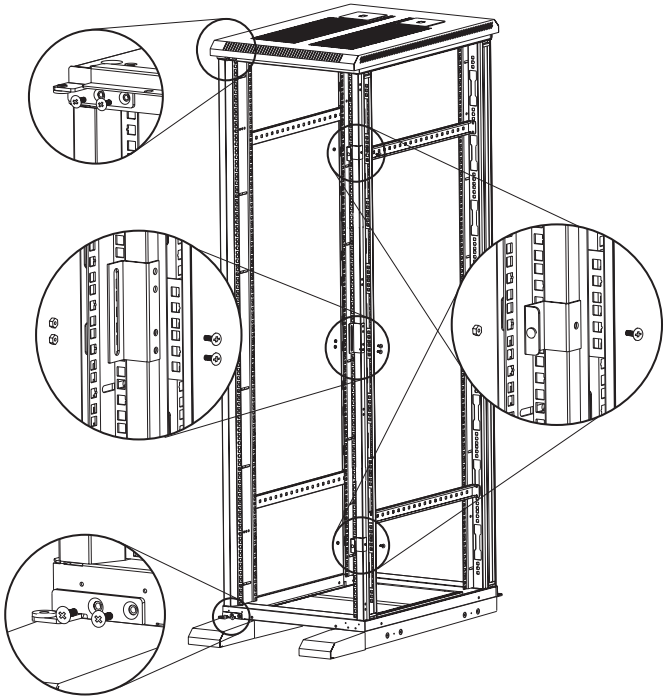
Remove the hinge pin brackets, bumpers, and latch plates

Note: Remember the location and distance between all items being removed. You will need to duplicate this positioning when reinstalling.

4. Use a Phillips head screwdriver to remove the hinge pin brackets, bumpers, and latch plate from the enclosure frame.



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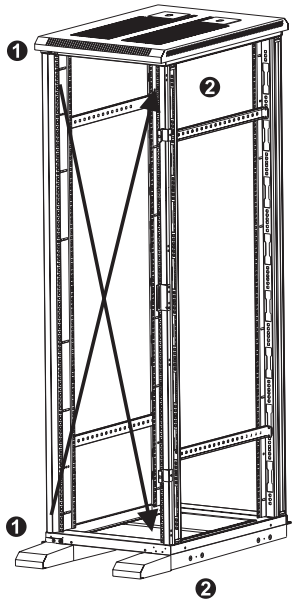
Reinstall the hinge pin brackets

5. Reinstall the hinge pin brackets, bumpers, and latch plate on the opposite side of the enclosure.
   a. Remove the small plastic plugs covering the insertion holes in the plinths and the top of the enclosure frame.
   b. Reinstall the two hinge pin brackets from their original position ❶ to their new position ❷.



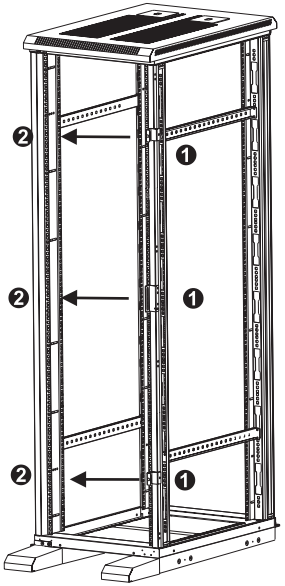
   c. Secure the hinge pin brackets by threading the hex nuts onto the screws. Hand-tighten the screws; they will be tightened firmly later in the procedure.

Continued on next page

Reinstall the latch plate and bumpers

6. Reinstall the latch plate and the two door bumpers from their original position ❶ to their new position ❷.

   Note: Be sure to maintain the original spacing between the latch plate and bumpers, as well as their vertical relationship with the enclosure frame.



7. Reinstall the small plastic plugs in the frame and the plinths in the empty holes that once held the hinge pin brackets and hinge pins before the door was reversed.

Continued on next page

Reinstall the door assembly

8. Reinstall the door assembly.

To avoid personal injury or damage to the enclosure, one person should support the door while another secures the door to its frame.

   a. Reverse the steps for removing the door. (See page 18.)
   b. Make sure that the door opens and closes properly and then firmly tighten the countersunk screws to secure the hinge pin brackets to the enclosure frame.

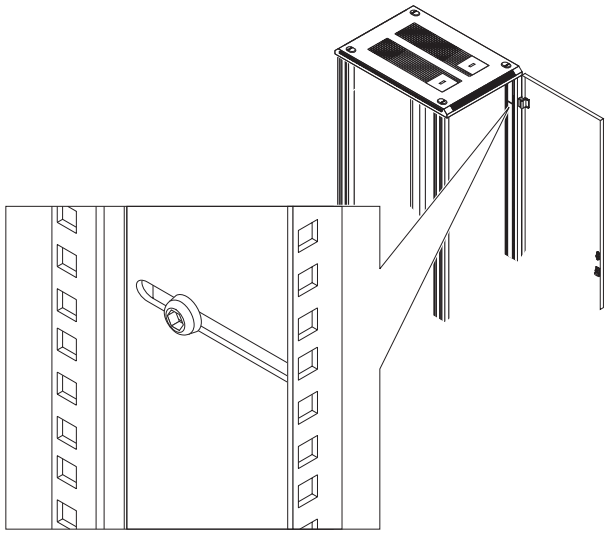
9. Reinstall the side panels. (See page 13.)

Mounting Rails

The vertical mounting rails are factory-installed in the proper position for use with Compaq® rack-mountable equipment that has a depth of 29.13 inches (739 mm). You can adjust the rails to the front or rear a total of 2.35 inches (60 mm) to accommodate different rails or equipment with various depths. You can also move the rails by attaching them to the horizontal braces. The following sections describe the procedures for adjusting the position of the mounting rails and for moving them within the enclosure.

Location of screws for adjusting the mounting rail

The location of the screws that govern the position of the mounting rails is shown below.



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How to adjust the mounting rails

1. Use the 5 mm Allen wrench (included) to loosen (but not remove) the socket-head screws in the slots of the mounting rail.

   Note: If your enclosure was shipped with equipment already installed, you will need to remove the socket-head screws in the round holes of the mounting rails before adjusting or moving the rails.
2. Slide the mounting rail forward or rearward as desired. Tighten each screw.

How to move the rails to a new position

1. Remove the side panels from the enclosure. (See page 13.)
2. Use the 5 mm Allen wrench (included) to remove the socket-head screws in the slots of the mounting rail.
3. Locate the new position for the mounting rail.
4. Secure the vertical mounting rail to each horizontal brace:

   Note: You may have to adjust the position of the brace up or down to align it with the mounting channel in the rear mounting rail. (See "How to move a brace" on page 25.)

   a. Insert a caged nut into the appropriate holes at the new position on the upper brace.

   b. Place the mounting rail at the new position and insert a socket-head screw through the rail, brace, and caged nut.

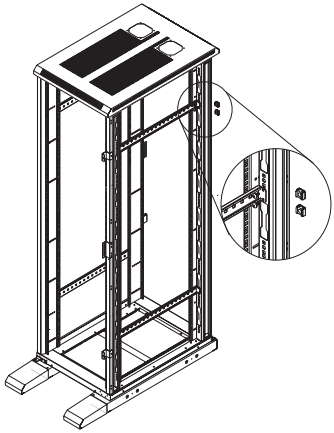
   c. Tighten the screw to secure the mounting rail to the brace.

Braces

Each side of the enclosure has two horizontal braces between the vertical frame posts. These adjustable braces support the mounting rails and are available for managing cables.

How to move a brace

1. Use the 5mm Allen wrench (included) to remove the four socket-head screws that are holding the brace to the frame posts.



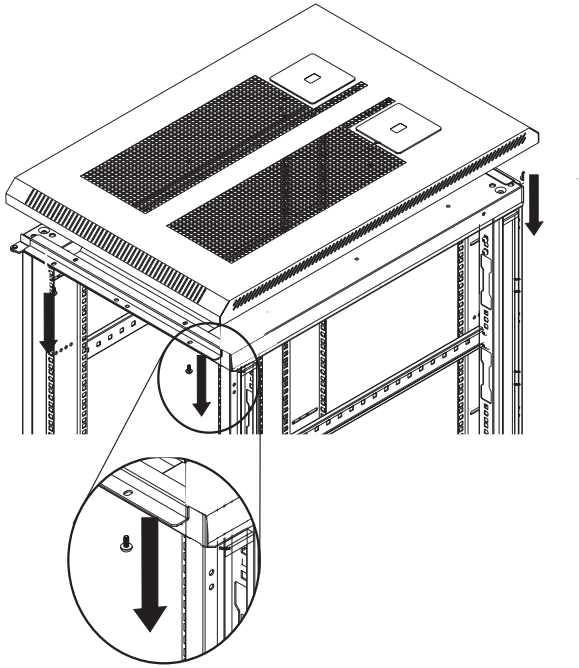
2. Remove the caged nuts from the frame post. (See page 15.)
3. Locate the new position for the brace and secure the brace to the frame posts:
   a. Insert a caged nut into the appropriate holes at the new position on the frame post.
   b. Place the brace at the new position and insert a socket-head screw through the brace, frame post, and caged nut.
   c. Tighten the screw to secure the brace to the frame post.

How to Remove the Roof

You can remove the roof to install to gain acess to the finishing trim.

Procedure

Remove the roof from the enclosure by removing the four socket-head screws from the inside corners. Use a 5 mm Allen wrench.



Joining Enclosures Together

You can expand your installation by joining an AR1001A expansion enclosure to a AR1000A enclosure. The procedure involves removing one side panel of the AR1000A enclosure and attaching it to the open side of the AR1001A expansion enclosure. The AR1001A enclosure includes expansion hardware and vertical and horizontal trim that cover the gap between the joined enclosures for a finished appearance.

Before joining enclosures

Sometimes you must change enclosure configurations before joining enclosures together. Often this means reversing doors on one of the enclosures or moving the trim from one side of an enclosure to the other.

Preliminary steps for joining enclosures

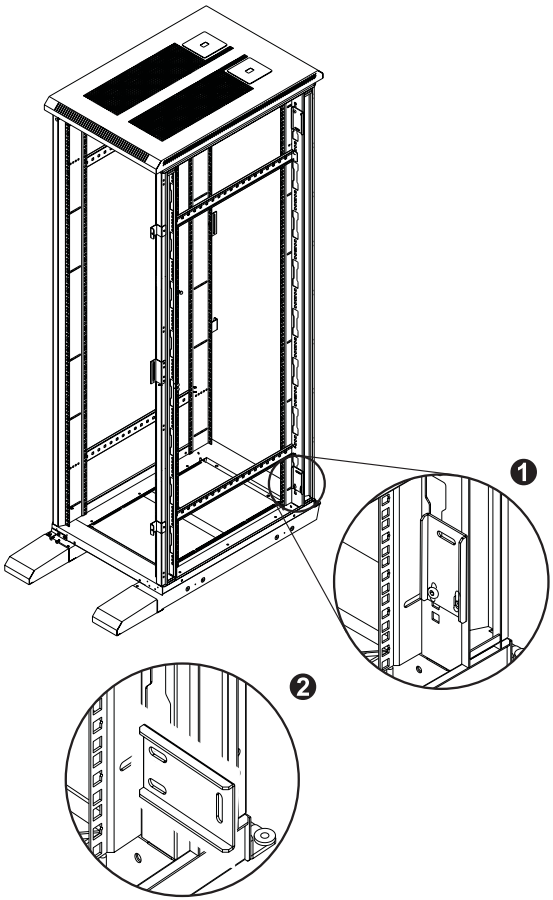
1. Reverse the door(s), if necessary. (See page 17.)
2. Remove the side panel from the existing enclosure or bay. (See page 13.)
3. If necessary, move the finishing trim from one side of the AR1001A to the other side. (See page 30.)

Continued on next page

Joining Enclosures Together *continued*

How to join enclosures

1. Connect the four expansion brackets pre-installed on the AR1001A expansion enclosure to the AR1000A enclosure:
   a. Using the 5 mm Allen wrench (included), loosen the socket-head screw that is holding the expansion bracket to the AR1001A enclosure.
   b. Rotate the bracket from its original position ❶ to its new position ❷.



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How to join enclosures, continued

c. Push the two enclosures together until the slot in the free end of the mounting bracket is aligned with a hole (or holes) in the frame post of the AR1000A enclosure

d. On the AR1000A enclosure, insert a caged nut into the hole (or holes) that align with the slot in the expansion bracket.

e. On the AR1001A expansion enclosure, insert a caged nut into the hole on the frame post that aligns with the second, empty hole on the expansion bracket.

f. Repeat steps a–e for each expansion bracket.

g. On the AR1000A enclosure, insert a socket-head screw through the slot in the expansion bracket, the frame post, and caged nut. Hand-tighten the screw.

h. On the AR1001A expansion enclosure, insert a socket-head screw through the second, empty hole in the expansion bracket, the frame post, and the caged nut. Hand-tighten the screw.

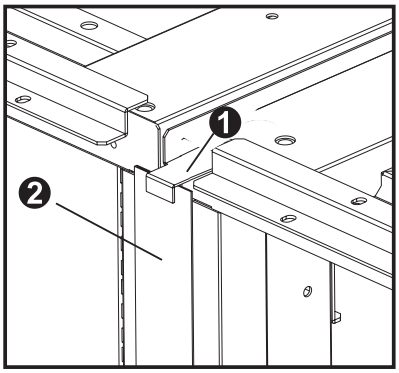
Note: Do not fully tighten the screws at this time. They will be secured after all four mounting brackets are installed.

i. Repeat steps g and h for the remaining 3 expansion brackets.

2. Align the two enclosures as closely together as possible and then tighten all socket-head screws on each of the four mounting brackets.
3. Reinstall the roof and any side panels required.

How to Move the Finishing Trim

The finishing trim is pre-installed to one side of the AR1001A expansion enclosure. The horizontal trim ❶ and the vertical trim ❷ cover the gap between enclosures after they have been joined together. Your site configuration may require you to move the trim to the other side of the enclosure.



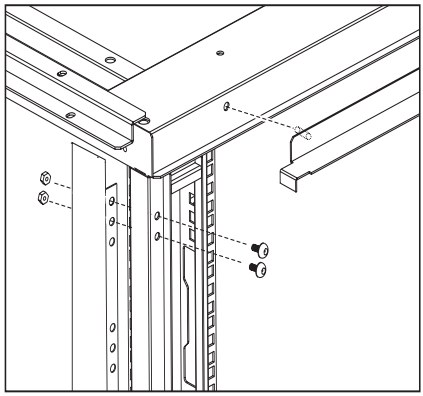
Procedure

1. Remove the doors from the AR1001A enclosure. (See page 18.)
2. Remove the roof. (See page 26.)
3. Using a 10 mm open-end wrench, remove the hex nuts securing the horizontal trim to the side of the enclosure.

Continued on next page

Procedure, continued

4. Using the 5 mm allen wrench, remove the socket-head screws securing the vertical trim to the side of the enclosure.



5. Reinstall the vertical trim to the opposite side of the enclosure.
   a. Remove the countersunk socket-head screw securing the door bumper to the frame of the enclosure.
   b. Insert the capped socket-head screw, removed form the other side of the enclosure, through the upper hole in the vertical trim, the door bumper and the original hole in the frame of the enclosure. Replace the hex nut loosely on the screw.
   c. Repeat the step above for the lower hole in the vertical trim.
   d. Tighten the screws securing the vertical trim to the enclosure assembly.

Continued on next page

How to Move the Finishing Trim *continued*

Procedure, continued

6. Reinstall the horizontal trim to the opposite side of the enclosure.
   a. Insert the studs on the horizontal trim through the mounting hole in the horizontal trim, and then through the appropriate hole in the frame of the enclosure. Replace the hex nut loosely on the screw.
   b. Repeat the step above for the other studs on the horizontal trim.

      Note: Make sure that the small ear at the end of the horizontal trim is hooked over the top of the vertical trim.
   c. Tighten the nuts securing the horizontal trim to the enclosure assembly.
7. Repeat steps 4–6 for the rear of the cabinet. To install the brackets, use the countersunk screws previously removed from the front door bumpers and latch plates. Use the socket-head screws previously used to secure the trim.
8. Reinstall any side panels required. (See page 13.)
9. Reinstall the roof of the enclosure. Replace the four socket-head screws with the 5 mm Allen wrench (included).

Product Specifications

Warranty Information

Limited warranty

APC warrants the NetShelter Premium Enclosure to be free from defects in materials and workmanship for a period of five years from the date of purchase. Its obligation under this warranty is limited to repairing or replacing, at its own sole option, any such defective products. This warranty does not apply to equipment that has been damaged by accident, negligence, or misapplication or has been altered or modified in any way. This warranty applies only to the original purchaser.

Obtaining service

To obtain service under warranty you must obtain a returned material authorization (RMA) number from APC or a designated APC service center. (Before contacting APC, open the rear door of the enclosure and locate the serial number on the center of the enclosure frame.) Products must be returned to APC or an APC service center with transportation charges prepaid and must be accompanied by a brief description of the problem encountered and proof of the date and place of purchase.

Warranty limitations

Except as provided herein, APC makes no warranties, express or implied, including warranties of merchantability and fitness for a particular purpose. Some jurisdictions do not permit limitation or exclusion of implied warranties; therefore, the aforesaid limitation(s) or exclusion(s) may not apply to the purchaser.

Except as provided above, in no event will APC be liable for direct, indirect, special, incidental, or consequential damages arising out of the use of this product, even if advised of the possibility of such damage.

Specifically, APC is not liable for any costs, such as lost profits or revenue, loss of equipment, loss of use of equipment, loss of software, loss of data, costs of substitutes, claims by third parties, or otherwise. This warranty gives you specific legal rights and you may also have other rights, which vary according to jurisdiction.

Specifications

Specifications

Item		Measurement
Height	AR1000A AR1001A	82 in. (207 cm)
	AR1100A	46 in. (116 cm)
Width (all enclosures)		24 in. (60 cm)
Depth (all enclosures)	with feet	42 in. (106 cm)
	without feet	34 in. (87 cm)
Clearance (for wiring between front door and vertical rail)		3 in. (8 cm)
Net Weight	AR1000A	331 lb (150 kg)
	AR1001A	266 lb (120 kg)
	AR1100A	237 lb (107 kg)
Ventilation (front door)	AR1000A AR1001A	137 sq. in. (948 cm^2)
	AR1100A	69 sq. in. (477 cm^2)
Ventilation (rear door)	AR1000A AR1001A	771 sq. in. (5064 cm^2)
	AR1100A	381 sq. in. (2459 cm^2)
Ventilation (roof)	AR1000A AR1001A	203 sq. in. (1310 cm^2)
	AR1100A	223 sq in. (1439 cm^2)

www.apcc.com

APC Worldwide Customer Support

Customer support for this or any other APC product is available at no charge in any of the following ways:

- Visit the APC Web site to find answers to frequently asked questions (FAQs), to access documents in the APC Knowledge Base, and to submit customer support requests.
  - **http://www.apcc.com** (Corporate Headquarters)
    Connect by links to APC Web pages for specific countries and regions, each of which provides customer support information.
  - **http://www.apcc.com/support/**
    Submit customer support requests.
- Contact an APC Customer Support center by telephone or e-mail.
  - Regional centers:

APC Headquarters (U.S. and Canada)	(1) (800) 800-4272 (toll free)
Latin America	(1) (401) 789-5735 (United States) apctchla@apcc.com
Europe, Middle East, Africa	(353) (91) 702020 (Ireland) apceurtech@apcc.com
Japan	(03) 5434-2021 jsupport@apcc.com

  - Local, country-specific centers: go to **http://www.apcc.com/support/contact** for contact information.
- Contact the APC representative or other distributor from whom you purchased your APC product for information on how to obtain local customer support.

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